

399-3-22 (C5706) Log Data Report

Borehole Information:

Borehole: 399-3-22		Site: 300-FF-5			
Coordinates (WA St Plane)		GWL¹ (ft): 33.25	GWL Date: 11/19/07		
North (m)	East (m)	Drill Date	TOC Elevation	Total Depth (ft)	Type
not available	not available	11/07	not available	141	Cable

Casing Information:

Casing Type	Stickup (ft)	Outer Diameter (in.)	Inside Diameter (in.)	Thickness (in.)	Top (ft)	Bottom (ft)
Threaded Carbon Steel	0.8	11 3/4	10 7/8	7/16	0.8	138

Borehole Notes:

The logging engineer measured the casing and stickup using a steel tape. Measurements were rounded to the nearest 1/16 in.

Logging Equipment Information:

Logging System: Gamma 4N		Type: SGLS (60%) SN: 47TP22010A
Effective Calibration Date: 9/20/07	Calibration Reference:	HGLP-CC-022
	Logging Procedure:	HGLP-MAN-002, Rev. 0

Logging System: Gamma 4H		Type: NMLS SN: H310700352
Effective Calibration Date: 11/06/07	Calibration Reference:	HGLP-CC-021
	Logging Procedure:	HGLP-MAN-002, Rev. 0

Spectral Gamma Logging System (SGLS) Log Run Information:

Log Run	1	2 Repeat	3 Repeat		
Date	11/16/07	11/16/07	11/16/07		
Logging Engineer	Pearson	Pearson	Pearson		
Start Depth (ft)	134.0	85.0	79.5		
Finish Depth (ft)	0.0	72.0	79.5		
Count Time (sec)	100	100	1000		
Live/Real	R	R	R		
Shield (Y/N)	N	N	N		
MSA Interval (ft)	0.5	0.5	Stationary		
ft/min	N/A ²	N/A	N/A		
Pre-Verification	DN831CAB	DN831CAB	DN831CAB		
Start File	DN831000	DN831269	DN831296		
Finish File	DN831268	DN831295	DN831296		
Post-Verification	DN831CAA	DN831CAA	DN831CAA		
Depth Return Error (in.)	- 1	N/A	- 1		
Comments	No fine gain adjustment	No fine gain adjustment	No fine gain adjustment		

Neutron Moisture Logging System (NMLS) Log Run Information:

Log Run	4	5 Repeat			
Date	11/19/07	11/19/07			
Logging Engineer	Spatz	Spatz			
Start Depth (ft)	44.0	26.0			
Finish Depth (ft)	0.0	21.0			
Count Time (sec)	15	15			
Live/Real	R	R			
Shield (Y/N)	N	N			
Sample Interval (ft)	0.25	0.25			
ft/min	N/A	N/A			
Pre-Verification	DH832CAB	DH832CAB			
Start File	DH832000	DH832177			
Finish File	DH832176	DH832197			
Post-Verification	DH832CAA	DH832CAA			
Depth Return Error (in.)	0	0			
Comments	None	None			

Logging Operation Notes:

Logging was conducted with a centralizer on the sondes. Logging data acquisition is referenced to ground level. Repeat data were acquired in this borehole to evaluate each system's performance. In addition, a 1000 second counting time was used to gather additional detail at a total gamma anomaly at 79.5 ft.

Analysis Notes:

Analyst:	Henwood	Date:	11/20/07	Reference:	GJO-HGLP 1.6.3, Rev. 0
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Pre-run and post-run verifications for the SGLS (G4N) were acquired in the Amersham verifier, serial number 115 which is enhanced in the naturally occurring radionuclides K-40, U-238, and Th-232 (KUT). The verification criteria were met.

A casing correction for 7/16-in.-thick casing was applied to the SGLS log data.

SGLS spectra were processed in batch mode using APTEC SUPERVISOR to identify individual energy peaks and determine count rates. Concentrations were calculated with EXCEL worksheet template identified as G4NSept07.xls using efficiency functions and corrections for casing, water, and dead time as determined from annual calibrations. No correction for dead time was necessary. A correction for water was applied to data acquired below 44 ft in depth.

The NMLS data are presented as counts per second. A calibration for casing inside diameters greater than 8-in. is not available.

Results and Interpretations:

A plot of manmade radionuclides is included for Cs-137 and processed uranium (U-235 and U-238). The plot indicates all detections based on the routine processing software. All of the detections were at or near the respective MDLs. Inspection of each spectrum, where a detection was indicated, revealed no full energy peaks. Therefore, the detections are considered to be statistical fluctuations and are not considered valid. No other manmade radionuclides were indicated.

There is a strong indication of radon in the groundwater. Comparison of the 1764 keV and 609 keV Bi-214 gamma rays show differing concentrations after corrections for water and casing. The casing and water correction factors decrease with increasing energy. Gamma rays originating inside the casing are not attenuated by the steel casing,

and the net effect of applying the correction factors is to amplify results from low-energy gamma rays. The fact that the 609 keV gamma ray results in a higher apparent concentration than the 1764 keV gamma line suggests that radon is present in the groundwater. Typical formation concentrations of naturally occurring U-238 are between approximately 0.5 and 1.5 pCi/g. The concentrations above the groundwater level are consistent with these values for the assays of both the 609 and 1764 keV peaks. Note that enhanced radon is not related to the existence of manmade uranium.

A total gamma anomaly at approximately 79.5 ft indicates enhanced natural U-238 as evidenced by numerous gamma rays recorded in the spectra originating primarily from Bi-214, a U-238 decay product. The concentration for U-238 as measured using the 1764 keV Bi-214 energy peak is approximately 4 to 6 pCi/g (12-18 ppm). The existence of Bi-214 indicates natural uranium rather than processed uranium. Decay products at the location of Bi-214 in the U-238 decay chain would not have time to build in to any appreciable amount from processed uranium. Slightly elevated Th-232 also exists at this depth location and contributes to the total gamma activity. The log data suggest a thin sediment layer of naturally occurring radionuclides.

The neutron moisture results are reported in counts per second because no valid calibration is available for borehole inside diameters greater than 8 inches. It is not known to what degree this measurement reflects formation moisture.

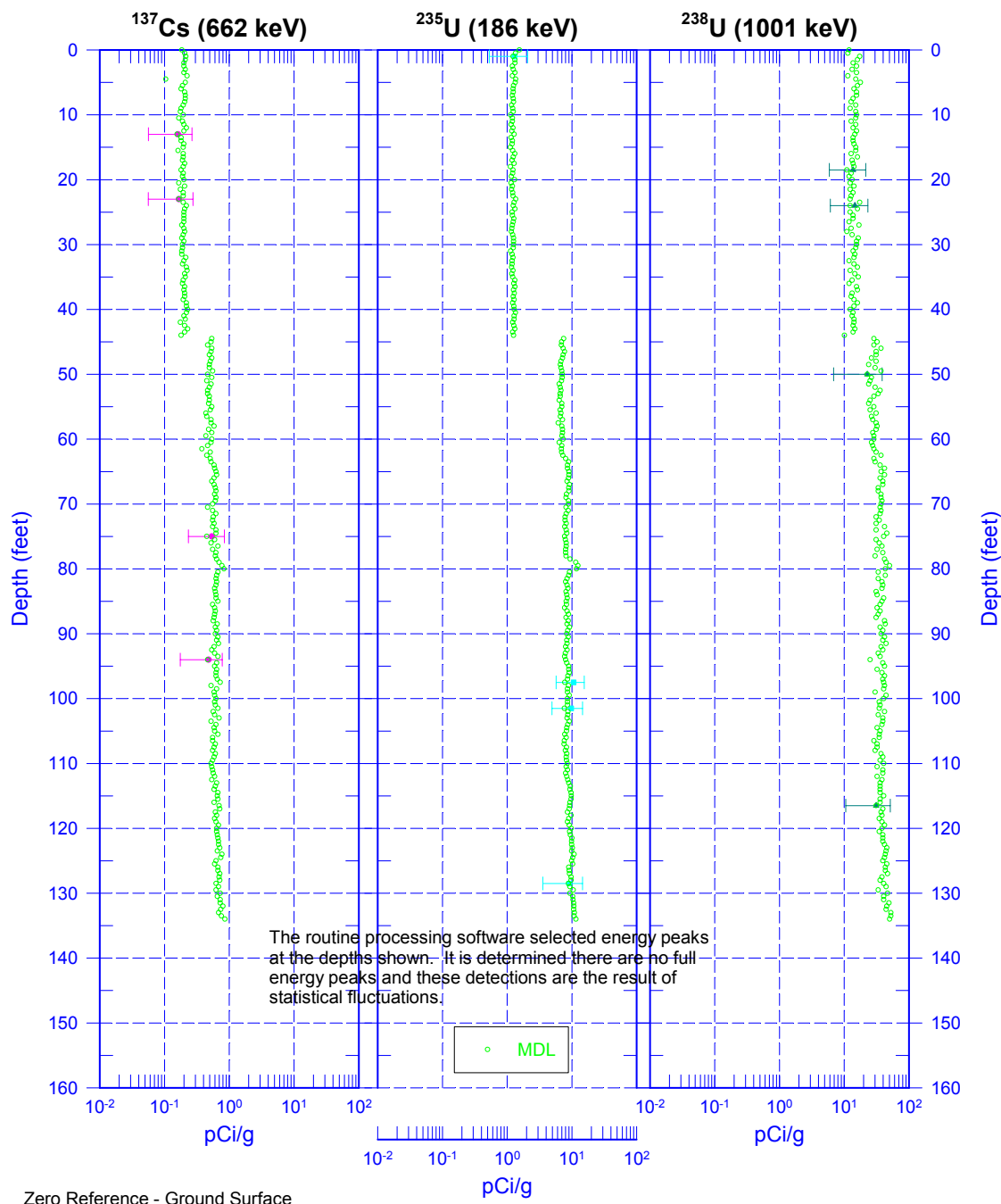
The repeat sections generally indicate good agreement of the naturally occurring KUT and moisture.

List of Log Plots:

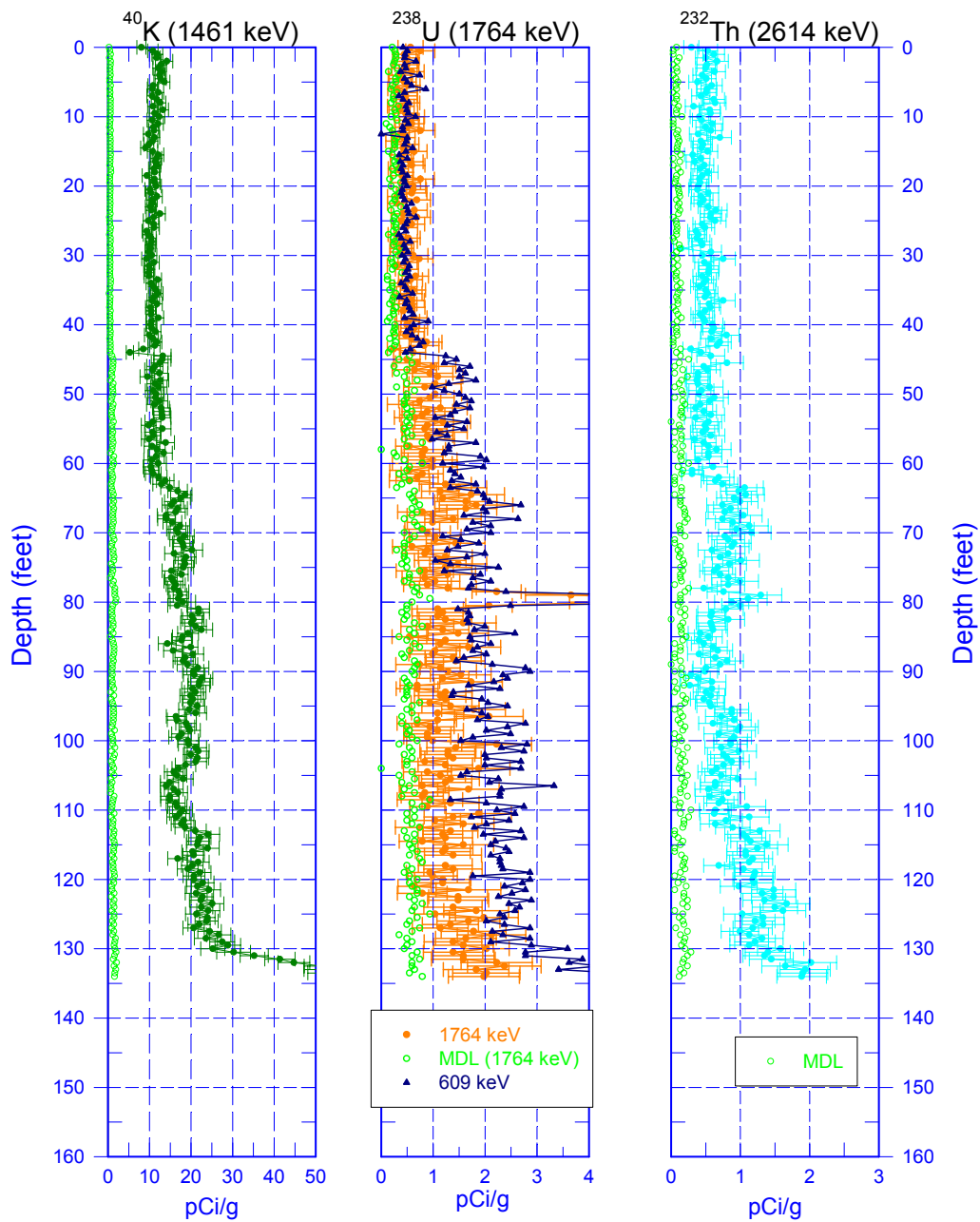
Manmade Radionuclides
Natural Gamma Logs
Combination Plot
Total Gamma & Moisture
Total Gamma & Dead Time
Repeat Section of Natural Gamma Logs
Moisture Repeat Section

¹ GWL – groundwater level

399-3-22 (C5706) Manmade Radionuclides

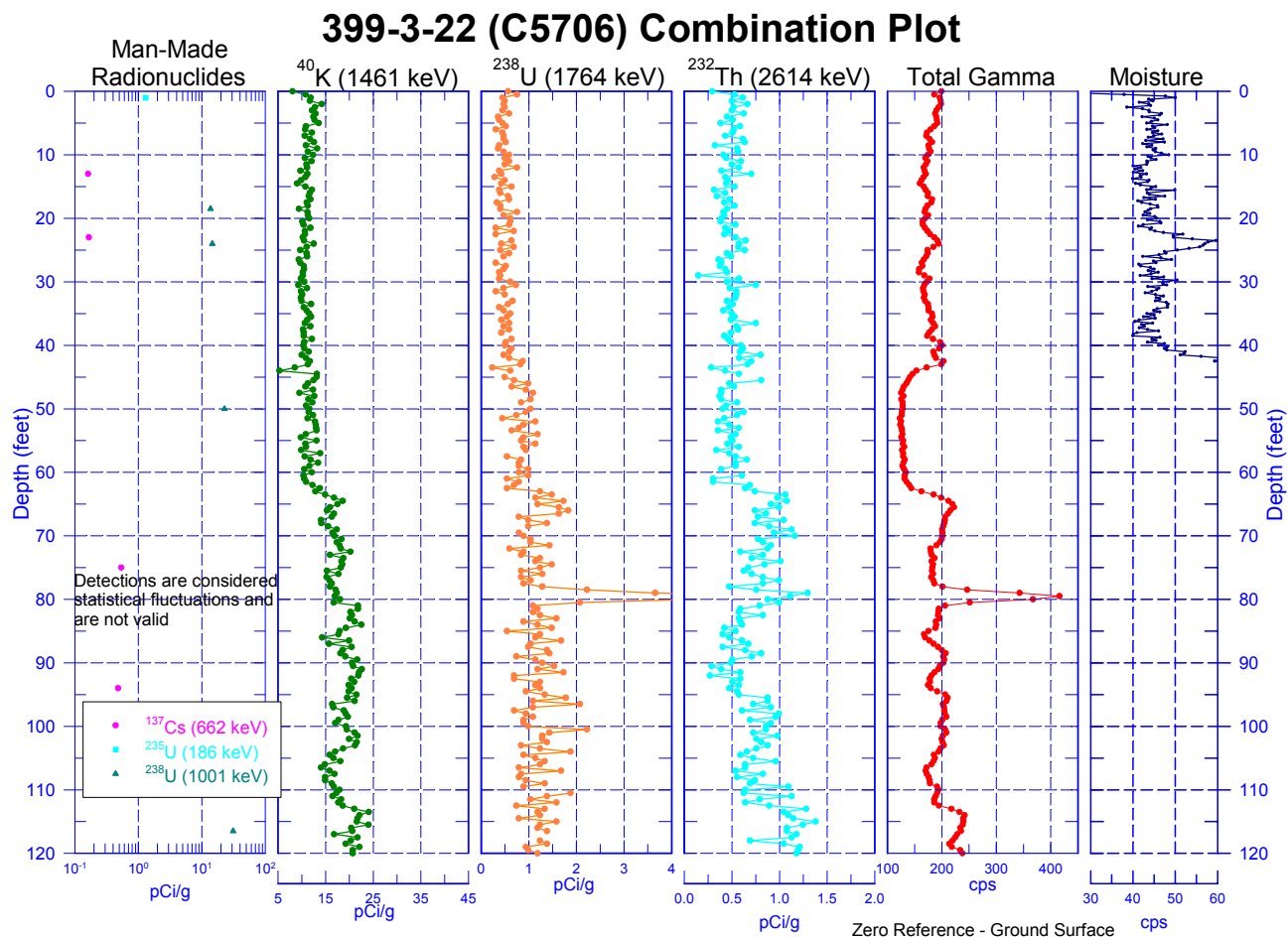


399-3-22 (C5706) Natural Gamma Logs

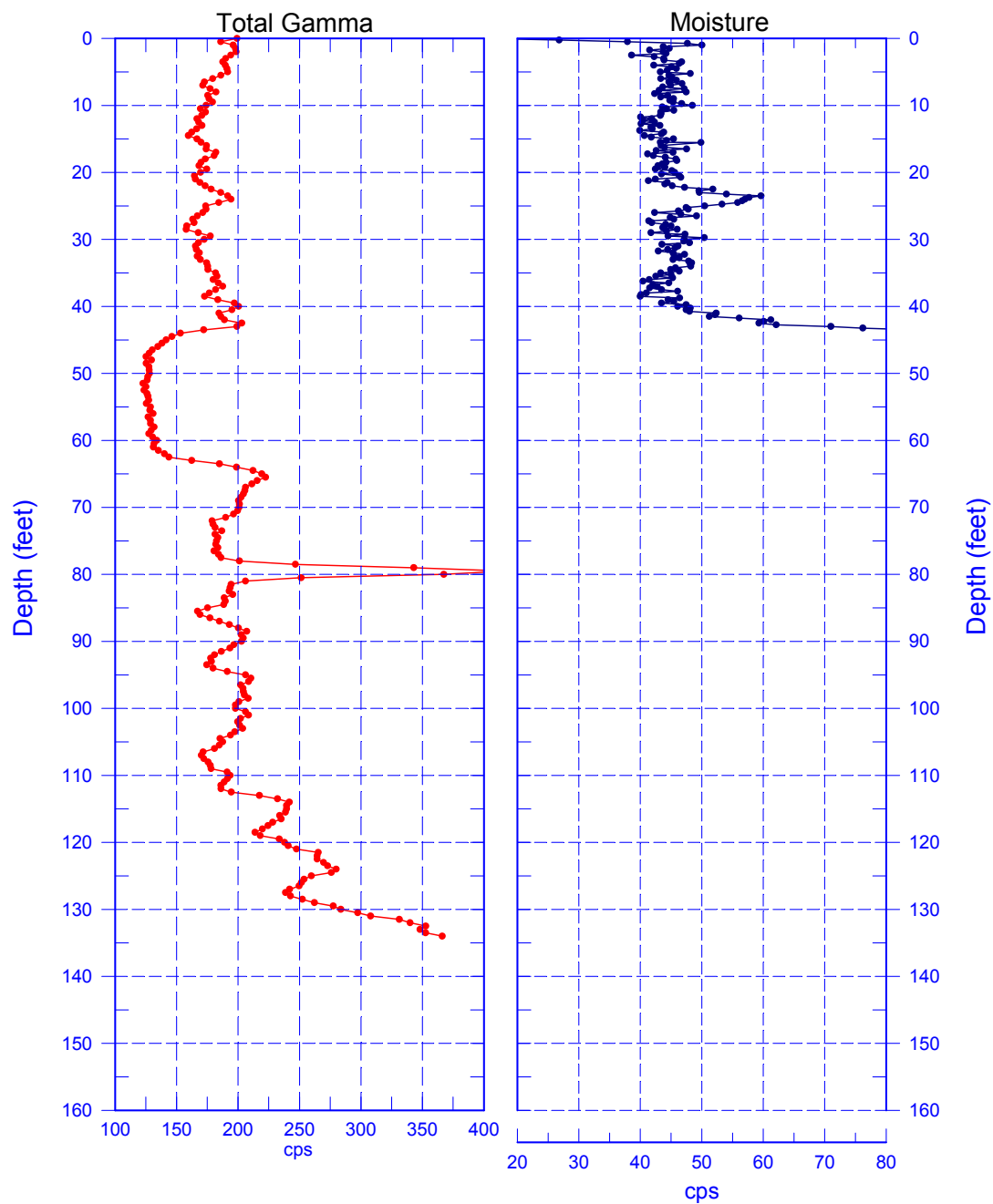


Zero Reference - Ground Surface

HGLP-LDR-097

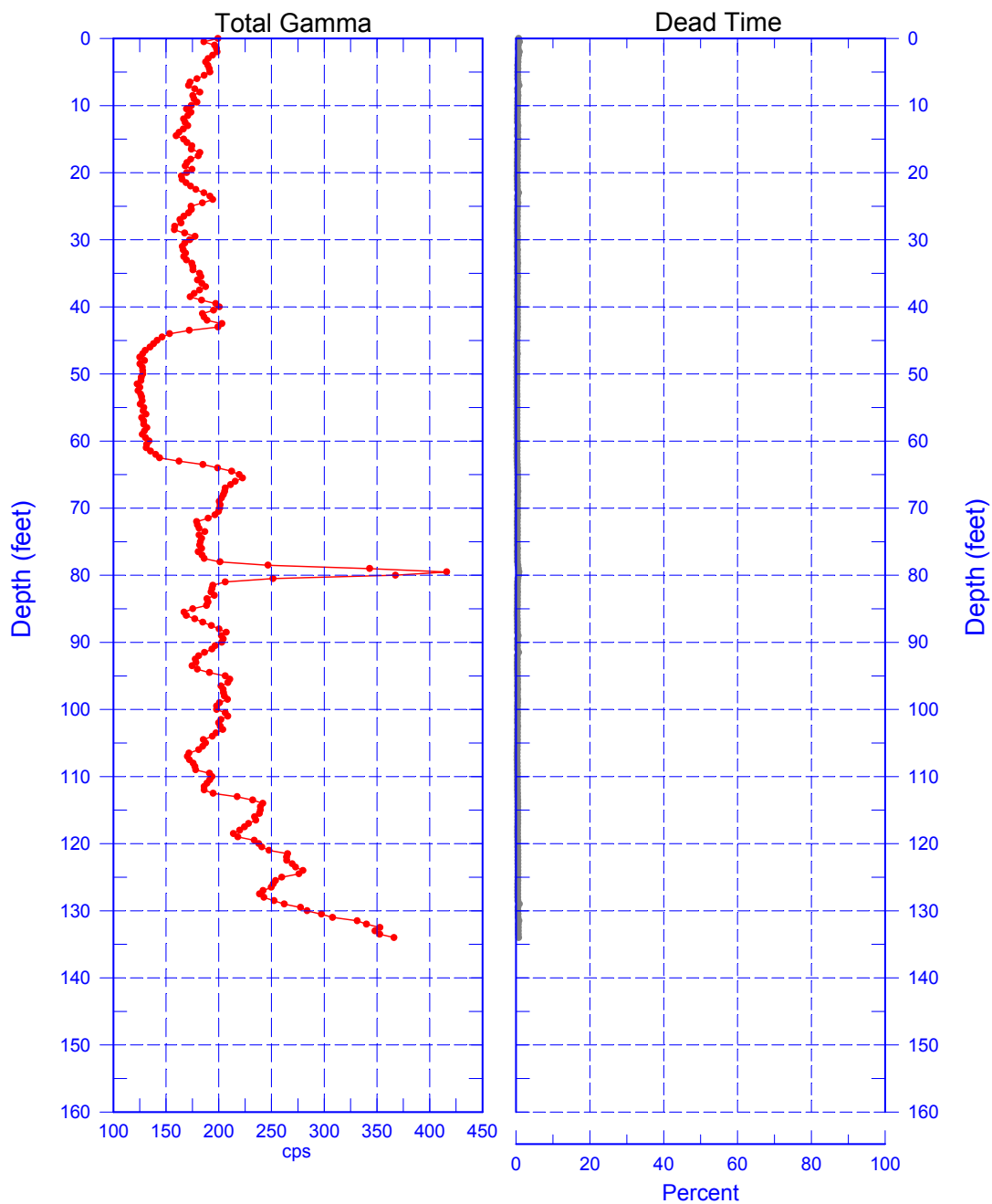


399-3-22 (C5706) Total Gamma & Moisture



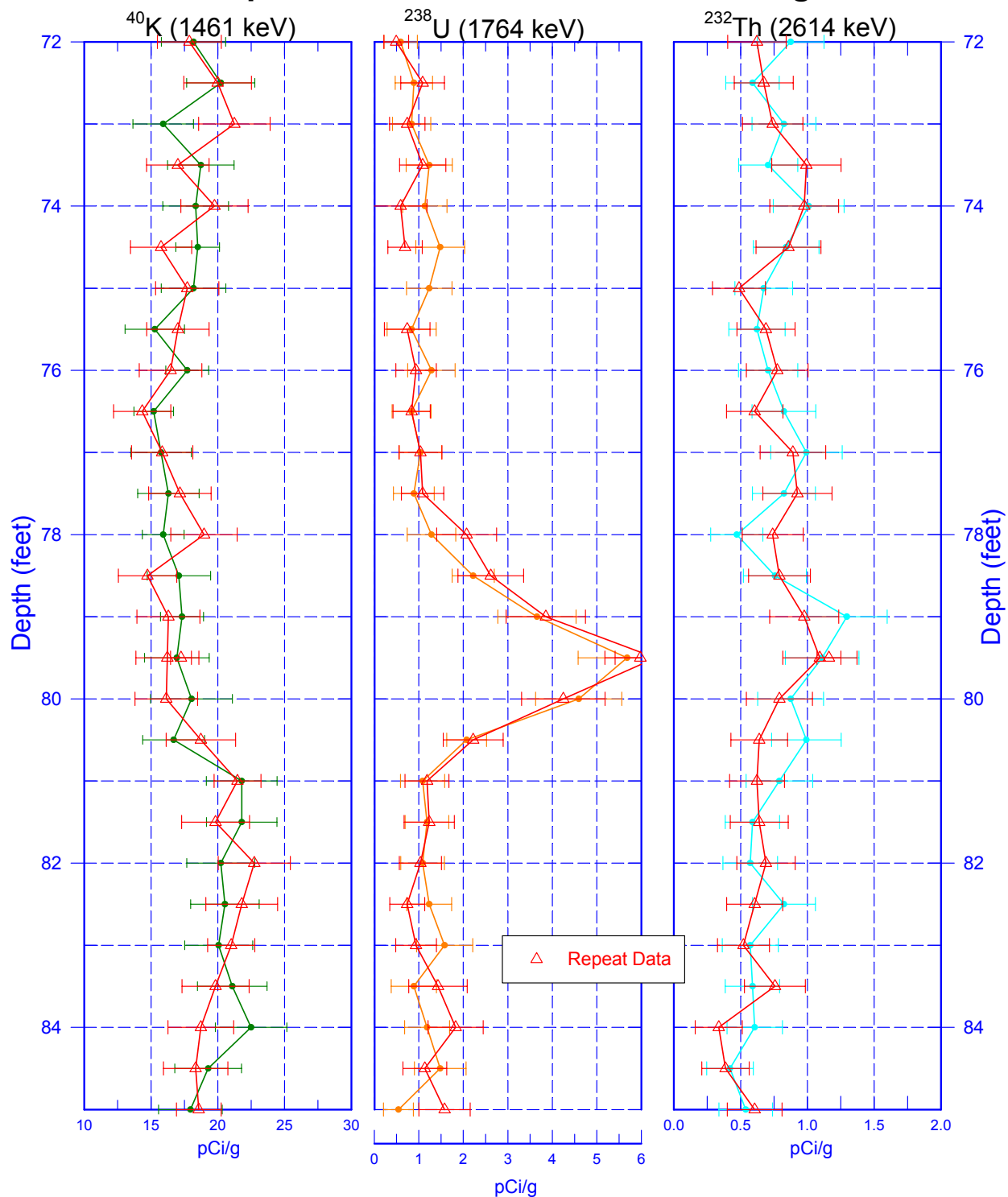
Reference - Ground Surface

399-3-22 (C5706) Total Gamma & Dead Time

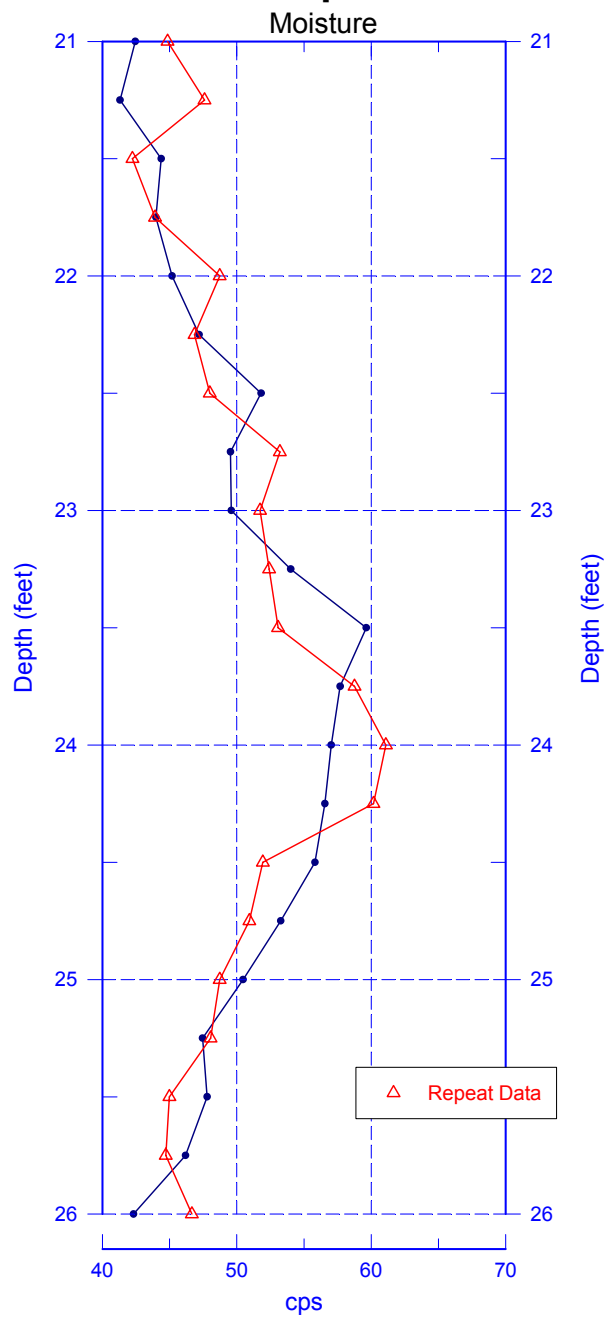


Reference - Ground Surface

399-3-22 (C5706) Repeat Section of Natural Gamma Logs



399-3-22 (C5706) Moisture Repeat Section



Reference - Ground Surface